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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
IGYARTO, CAROLYN	
ART UNIT	**PAPER NUMBER**
2884	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,056	COMBES ET AL.	
	Examiner	Art Unit	
	Carolyn Igyarto	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3 Jan. 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement submitted on 3 January 2006 has been considered by the Examiner and made of record in the application file.

Response to Amendment

3. The preliminary amendment filed on 3 January 2006 was accepted and entered. Accordingly, changes have been made to the specification. Claims 4, 6-9, 11-16, 18-21, and 23 have been amended. No new claims have been added. No claims have been cancelled. Thus, claims 1-23 are currently pending in this application.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-6, 9, 11-13, 16-17, and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by McGlade, Stuart (US 4,806,760), hereinafter referred to as McGlade.

6. With respect to **claim 1**, McGlade teaches a device for detecting infrared radiation (Abstract) comprising a resonator element (12) fixably attached to a supporting frame (13), characterised in that the supporting frame is arranged to absorb infrared radiation received by the device (col. 2, lines 66-68; col. 3, lines 34-36).

7. With respect to **claim 2**, McGlade teaches the supporting frame comprises a suspended portion spaced apart from the underlying substrate of the device (7 Fig. 1; 30 Fig. 2; col. 4, lines 24-25), the resonator element being fixably attached to the suspended portion (7 Fig. 1).

8. With respect to **claim 3**, McGlade teaches the suspended portion is spaced apart from the underlying substrate by a distance that is sufficient to form a resonant absorption structure for radiation having a wavelength within the infrared detection band of the device (Abstract; col. 3, lines 55-57).

9. With respect to **claim 4**, McGlade teaches the suspended portion is suspended from the underlying substrate on at least one leg (16).

10. With respect to **claim 5**, McGlade teaches the at least one leg comprises conductive material arranged to provide an electrical connection between the suspended portion and the underlying substrate (col. 2, lines 21-26).

11. With respect to **claim 6**, McGlade teaches the supporting frame comprises a layer of infrared absorbent material (col. 2, lines 66-68).

12. With respect to **claim 9**, McGlade teaches oscillation means to drive the resonator element into resonance (col. 1, lines 44-46).

13. With respect to **claim 11**, McGlade teaches the resonator element is fixably attached to the supporting frame at two or more points (7 Fig. 1).

14. With respect to **claim 12**, McGlade teaches the resonator element comprises an elongate flexible beam (12).

15. With respect to **claim 13**, McGlade teaches the supporting frame comprises a layer of material having an aperture defined therein (7 Fig. 1).

16. With respect to **claim 16**, McGlade teaches a plurality of detection elements, each detection element comprising a resonator element fixably attached to a supporting frame (col. 4, lines 23-25; 30 Fig. 2).

17. With respect to **claim 17**, McGlade teaches each detection element has an axis of symmetry (Fig. 2).

18. With respect to **claim 19**, McGlade teaches an array of detection elements is provided (col. 4, lines 20-24).

19. With respect to **claim 20**, McGlade teaches the device is formed using a micro-fabrication process (col. 3, lines 44-45).

20. With respect to **claim 21**, McGlade teaches readout electronics (col. 1, lines 46-50; col. 2, lines 24-26; col. 3, line 61).

21. Claims 1, 7-10, and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Burns, David W. ("Resonant Microbeam Sensors" Scientific Honyweller, Honeywell's Corporate. Minneapolis, US, 1996, pages 96-108, XP000678075), hereinafter referred to as Burns.

22. With respect to **claim 1**, Burns teaches a device for detecting infrared radiation (page 96, second paragraph (starting with "The second idea"), line 7; page 99, col. 2, lines 15-18; The microbeam taught by Burns is in thermal isolation from the temperature outside the device, because of the vacuum cavity enclosure (See Figure 2). Therefore, in order to detect temperature the device taught by Burns would inherently be a device for detecting infrared radiation.) comprising a resonator element (page 96, paragraph beginning with "The second idea", lines 4-5) fixably attached to a supporting frame (page 99, col. 1, lines 2-3), characterised in that the supporting frame

is arranged to absorb infrared radiation received by the device (supporting frame is made of silicon (see page 99, col. 1, lines 2-3 and Fig. 4) silicon absorbs infrared radiation. The supporting frame is also arranged so that the infrared radiation may be received by the device.).

23. With respect to **claim 7**, Burns teaches the resonator element and the supporting frame have different coefficients of thermal expansion (page 99, col. 2, lines 15-18).

24. With respect to **claim 8**, Burns teaches a resonant frequency of the resonator element is arranged to vary when infrared radiation is absorbed by the device (page 99, col. 2, lines 12-13).

25. With respect to **claims 9-10**, Burns teaches the oscillation means is arranged to electrostatically drive the resonator element (page 99, col. 1, lines 9-11).

26. With respect to **claims 13-14**, Burns teaches the resonator element comprises an elonqate flexible beam, said elongate flexible beam being arranged to lie across the aperture defined in the layer of material (Fig. 4).

27. With respect to **claim 15**, Burns teaches at least one of the supporting frame and resonator element comprise a shape memory alloy (page 98, col. 2, lines 10-13).

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

29. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

30. Claims 16, 18, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns as applied to claim 1 above, and further in view of Zhao et al. ("Optomechanical Uncooled Infrared Imaging System: Design, Microfabrication, and Performance" Journal of Microelectromechanical Systems, IEEE Inc. New York, US, vol. 11, no. 2, April 2002, pages 136-146, XP001125207., Hereinafter referred to as Zhao.

31. With respect to **claims 16 and 23**, Burns teaches all of the limitations of claim 1, as explained above. Burns further teaches fabricating an array of thermal detectors

(page 100, col. 2, line 2), but does explicitly teach using more than one in a device. Zhao, however, teaches using bi-material cantilever pixels in an Infrared imaging system or infrared camera for the benefit of enabling one to remotely sense, track targets, and navigate under visually restricted conditions (Abstract; Introduction, lines 1-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made incorporate multiple of the thermal detectors, taught by Burns, in a thermal imaging camera, as taught by Zhao, for the benefit of enabling one to remotely sense, track targets, and navigate under visually restricted conditions.

32. With respect to **claim 18**, Burns, as modified above, further teaches each detection element is arranged to output an electrical signal that is indicative of the resonant frequency of the associated resonator element (page 98, col. 1, lines 24-26; page 98, col. 2, lines 32-33; page 99, col. 2, lines 12-13).

33. **Claim 22** is rejected under 35 U.S.C. 103(a) as being unpatentable over McGlade. McGlade teaches all of the limitations of claim 1 and 21, as explained above, but is silent on the orientation of the readout electronics with respect to the resonator element or supporting frame. However, it is known in the art to integrate readout electronics with detectors for the benefit of increasing the resolution of the device, because the pixels are able to be more densely packed into the same area. It would have been obvious to one of ordinary skill in the art at the time the invention was made to vertically integrate for the benefit of increasing the resolution of the array.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carolyn Igyarto whose telephone number is (571) 270-1286. The examiner can normally be reached on Monday - Thursday, 7:30 A.M. to 5 P.M. E.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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